Issue: Why velocity is the same for a longer period of time? Why is it so smooth?

Algorithm:

For Data collection and Processing,

Collect 3-axis Acceleration data with respect to changing velocity.

Convert 3-axis Acceleration data into 1D data using DFT321 (https://github.com/haptics-nri/mfi16-figures/blob/master/dft321.m)

Then partitions the 1D Acceleration data based on nearly constant cycling velocities. (see Ruslan Thesis for example)

dft321 code : filtfilt(), FIR, IIR,

Segment : How long? (5sec?) How much is “nearly constant”? segment by manual? anycode?

LPC code : filter(b, a, in) b? a?

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For Modeling,

Follow this paper (https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5963667), which uses LPC for Signal Synthesis. You can use this code for LPC (<https://uk.mathworks.com/help/signal/ref/lpc.html> ).

For Rendering,

First, you need to find the two nearest velocities from the data you collected, then for these two velocities, take the weighted average of their respective acceleration signals. Then, feed these acceleration signals into the LPC for Signal Synthesis.